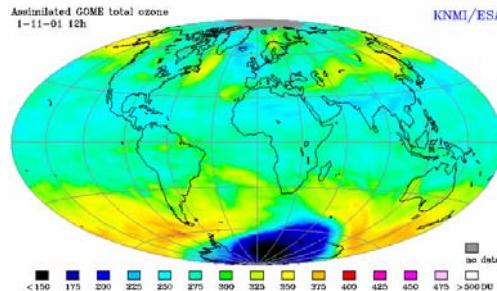


# GOMOS on Envisat

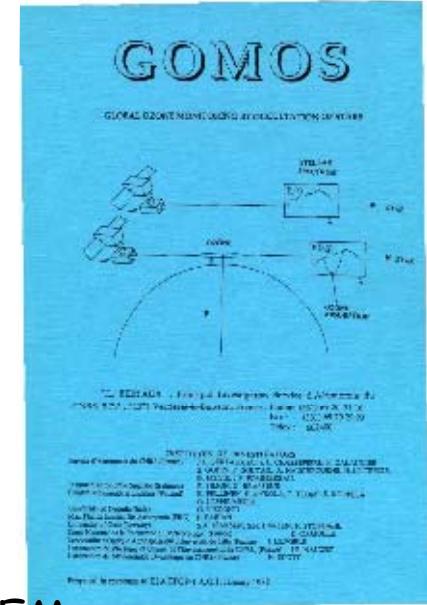
Erkki Kyrölä, FMI

1. Principle and instrument
2. Data processing
3. GOMOS data
4. Summary



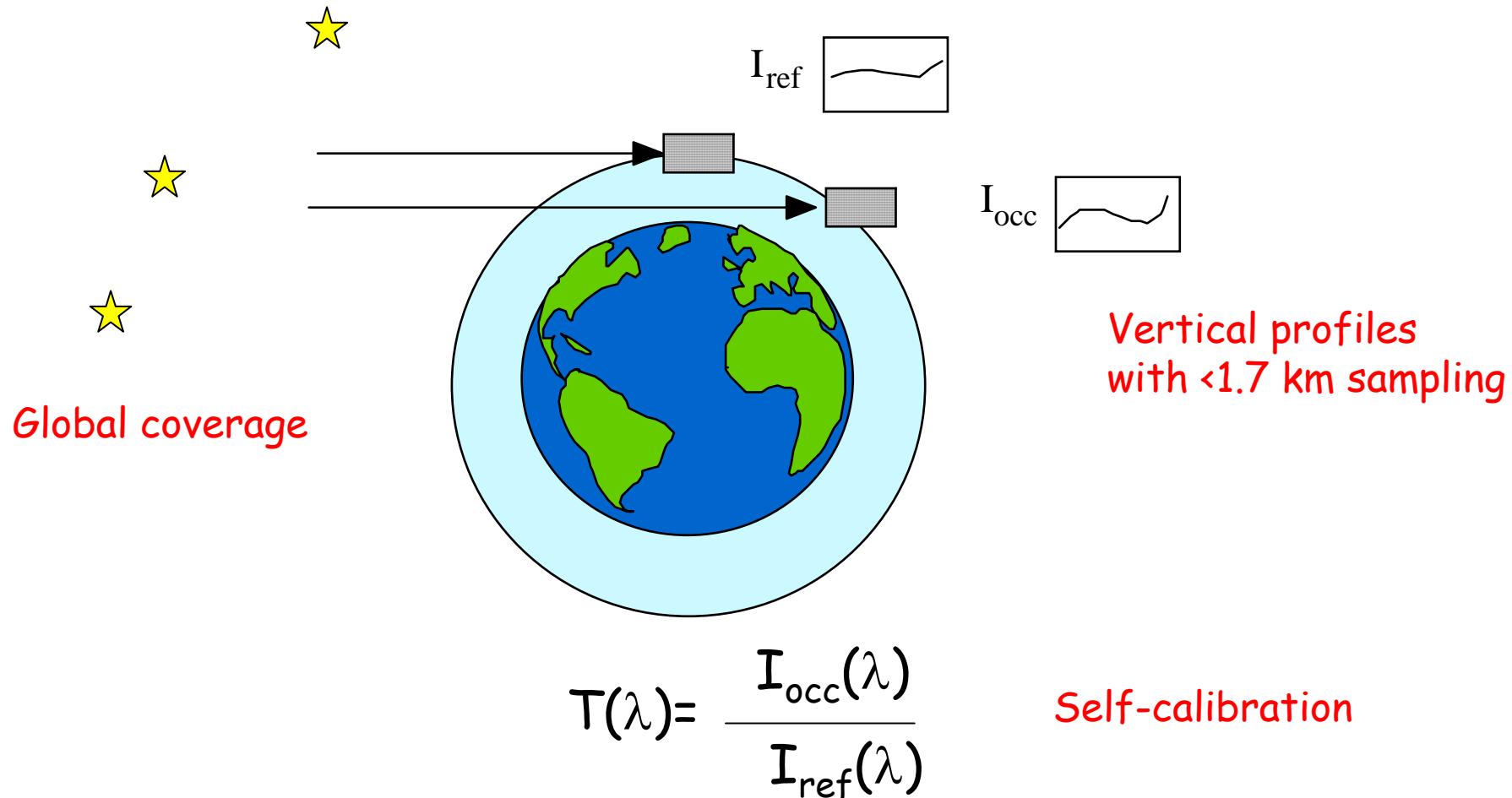


# GOMOS history

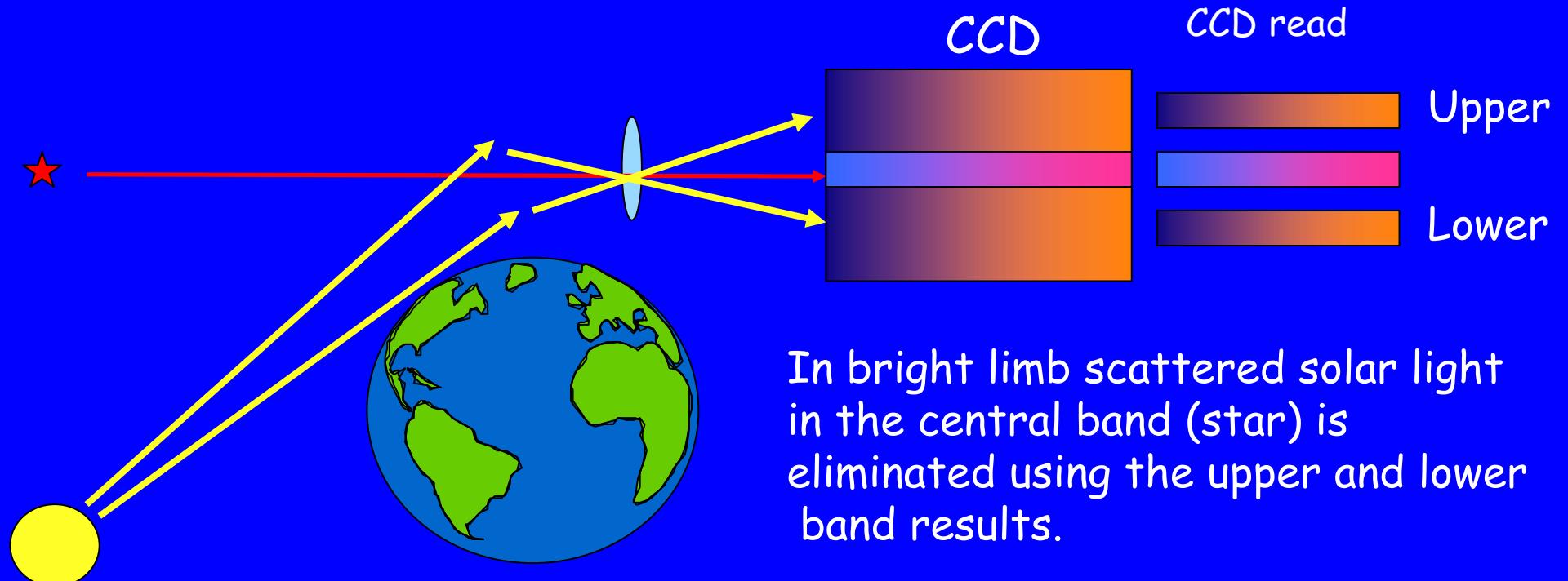


- 1988 FMI and Service d'Aeronomie proposed GOMOS for ESA's POEM (Envisat and Metop). Heritage: SPICAM (now on Mars Express)
- 1992 ESA adopted GOMOS as an ESA Funded Instrument  
Matra (Astrium): GOMOS main contractor
- 1995 ESA started GOMOS GS development:  
ACRI SA+FMI+Sd'A+IASB: Expert Support Laboratories  
Space Systems Finland: GOMOS processor  
FMI's Sodankylä observatory: GOMOS Level2 processing facility
- 2002 Envisat launched
- 2003 Steering system problems. 100% recovery in July
- 2005 Steering system problems Jan-Aug. 50% recovery in August  
First reprocessing starts in November

# Global Ozone Monitoring by Occultations of Stars

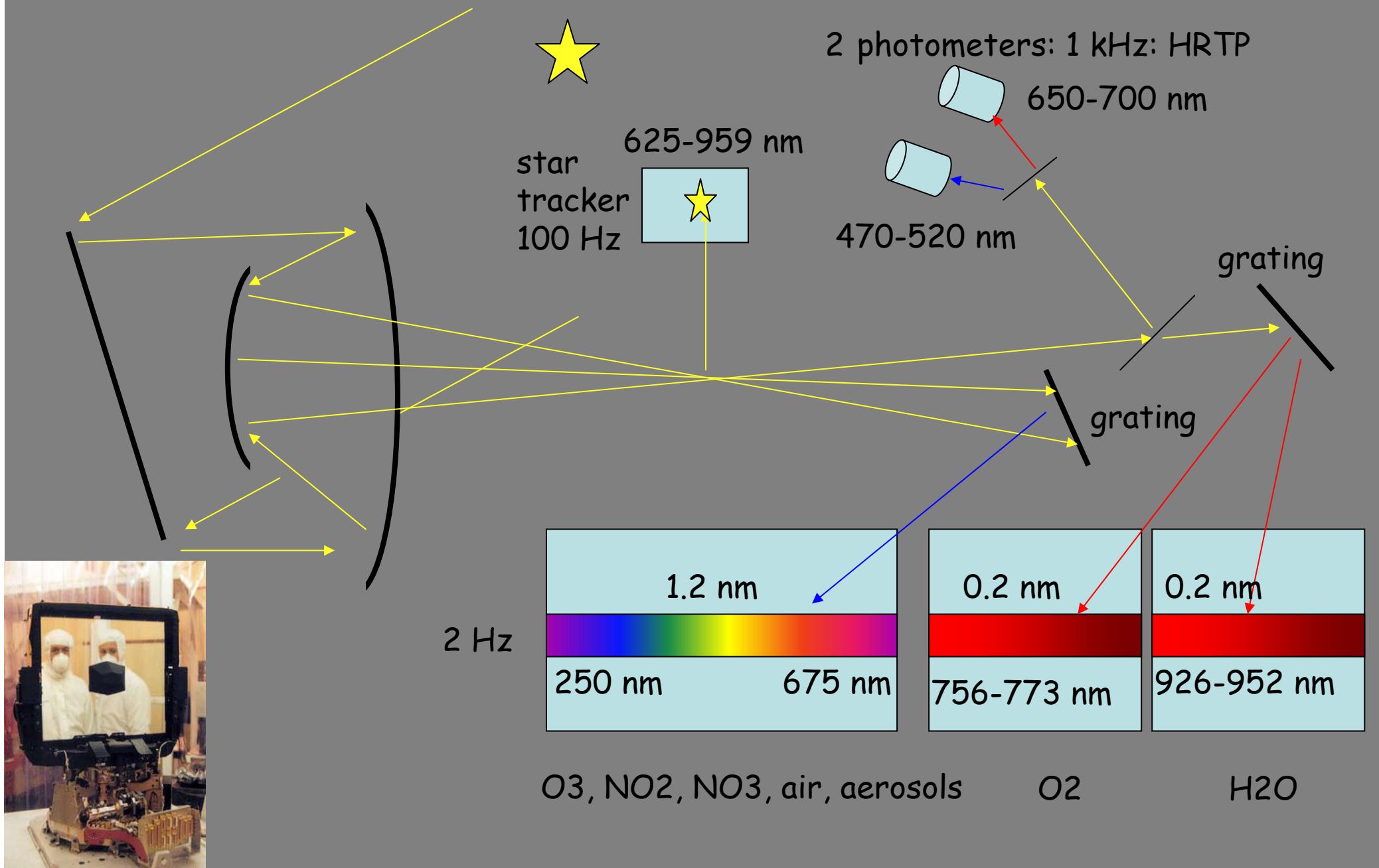


In bright limb GOMOS performs occultations and records scattered solar light

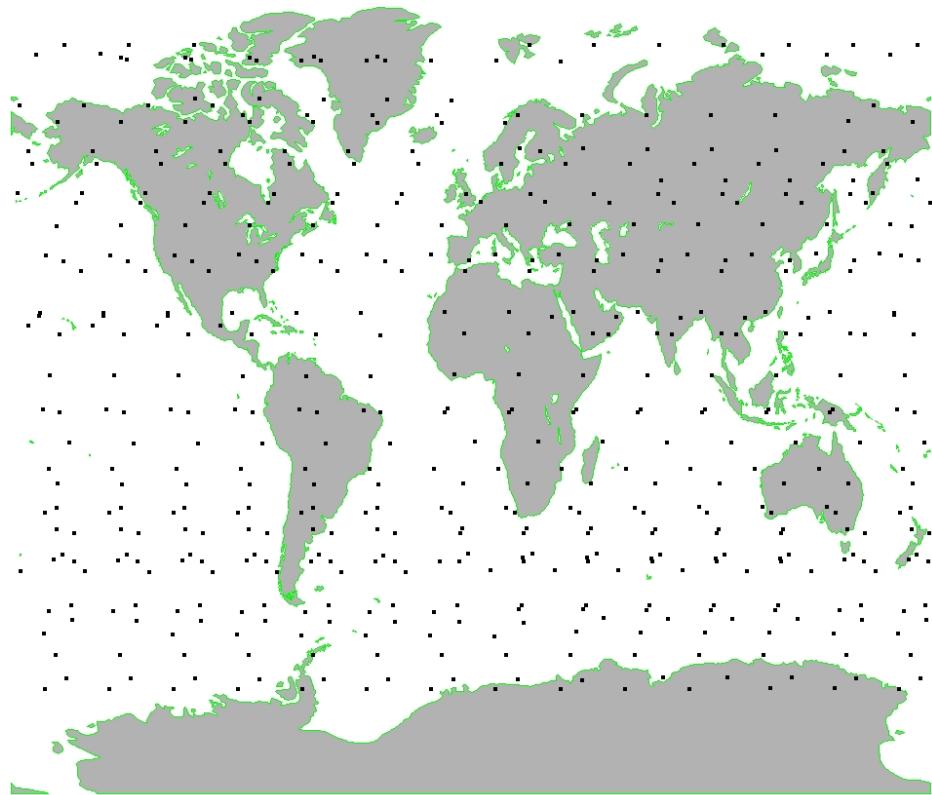


Upper and lower band measurements can be used for Sciamachy-type of retrieval.

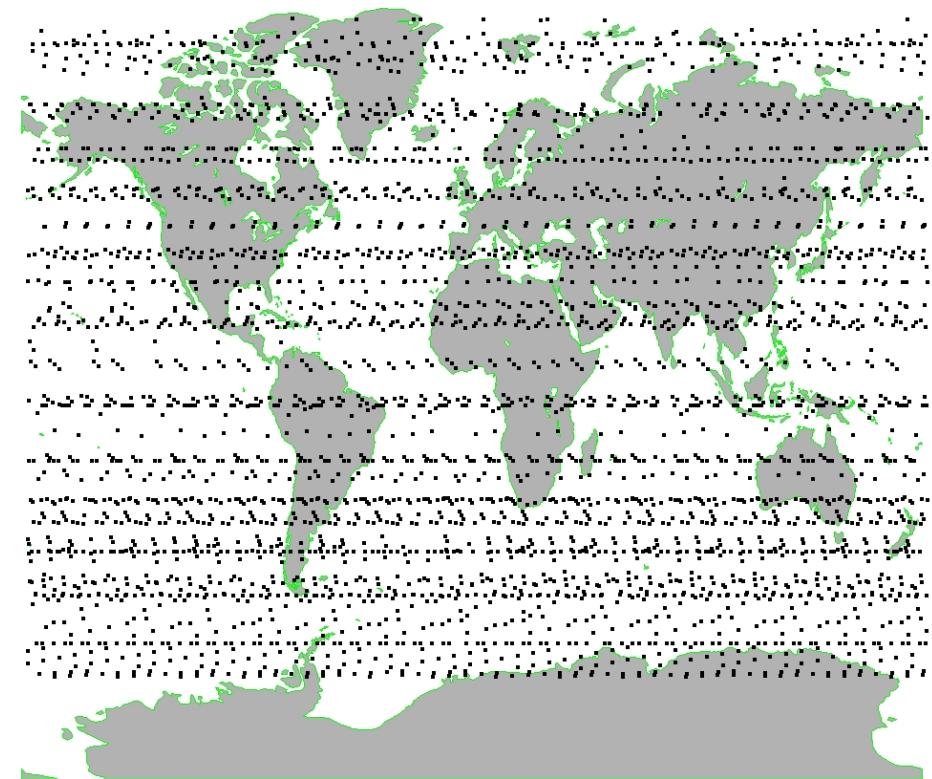
# GOMOS instrument: optics and detectors



# Measurement coverage

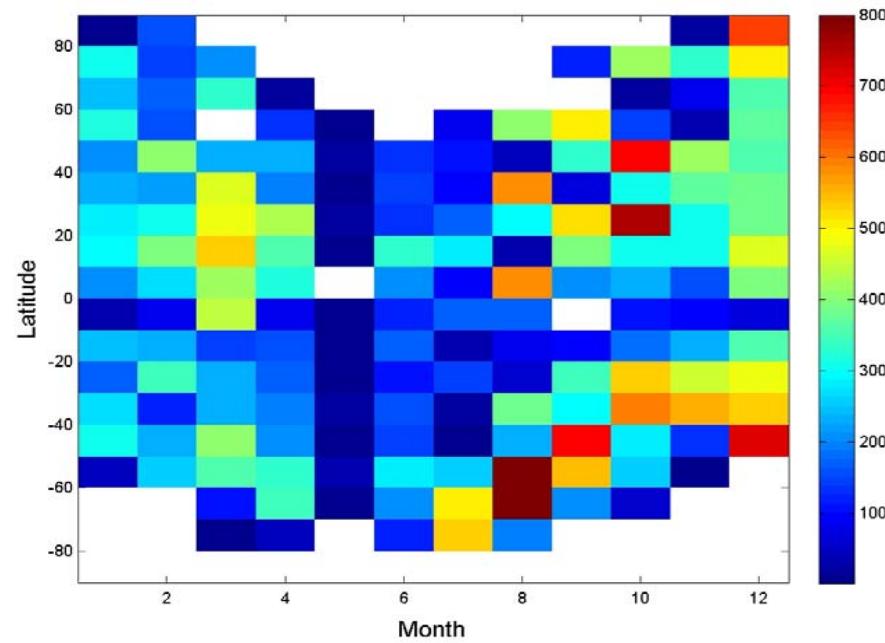


8.12. 2003: 519 occs

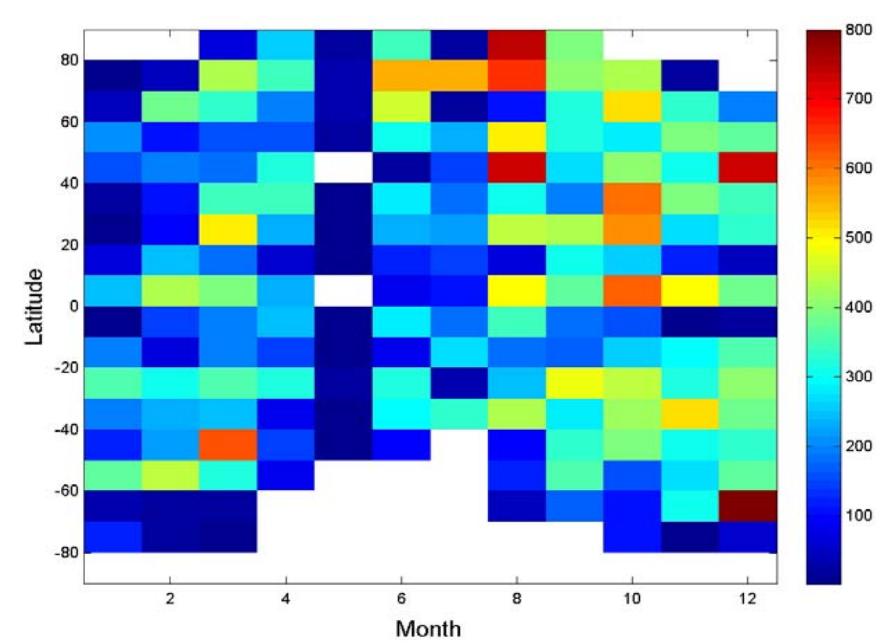


8-15.12. 2003: 3570 occs

# GOMOS: day and night coverage (2003)



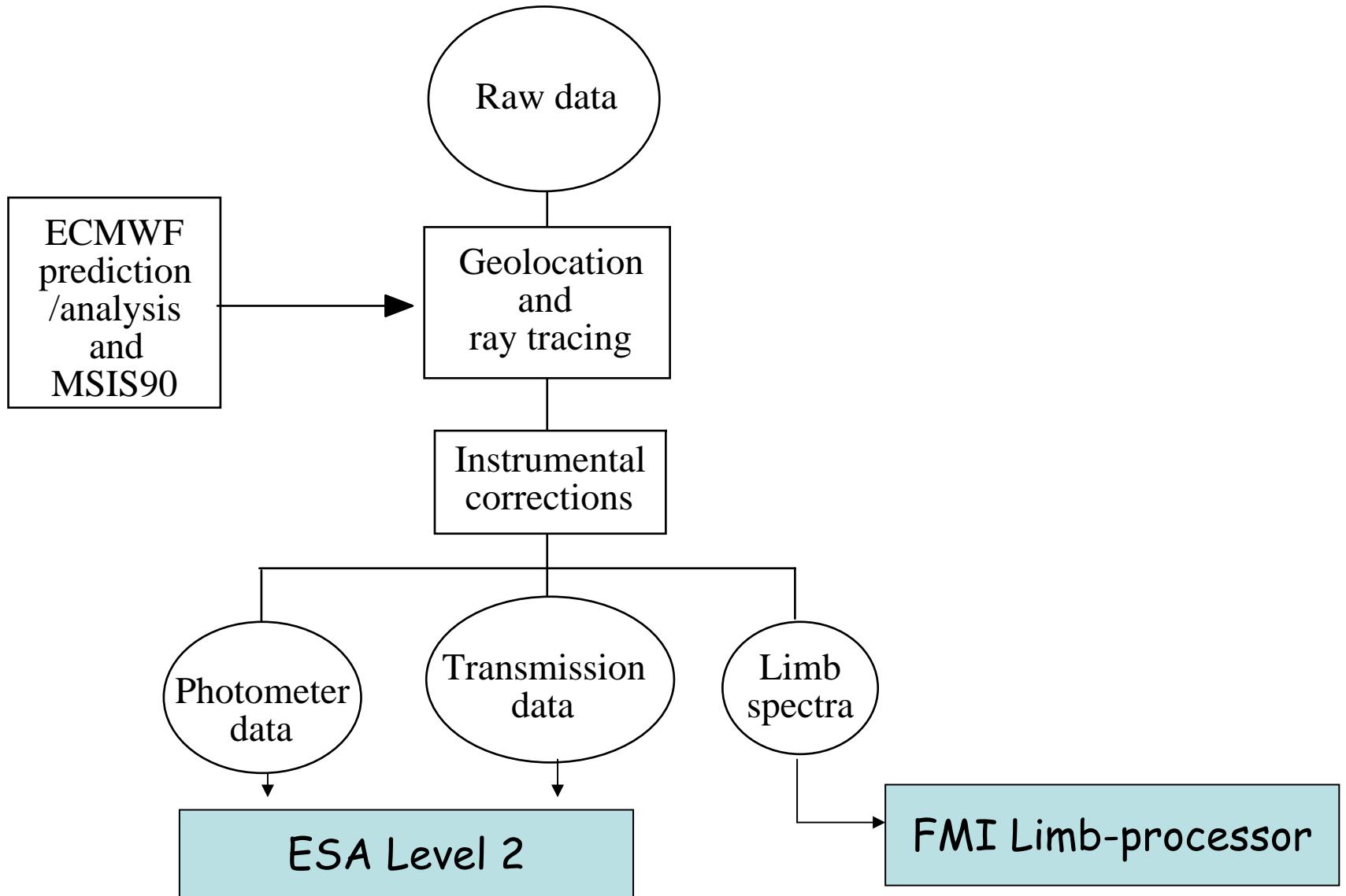
Night (45%)  
solar zenith: 108-180 deg



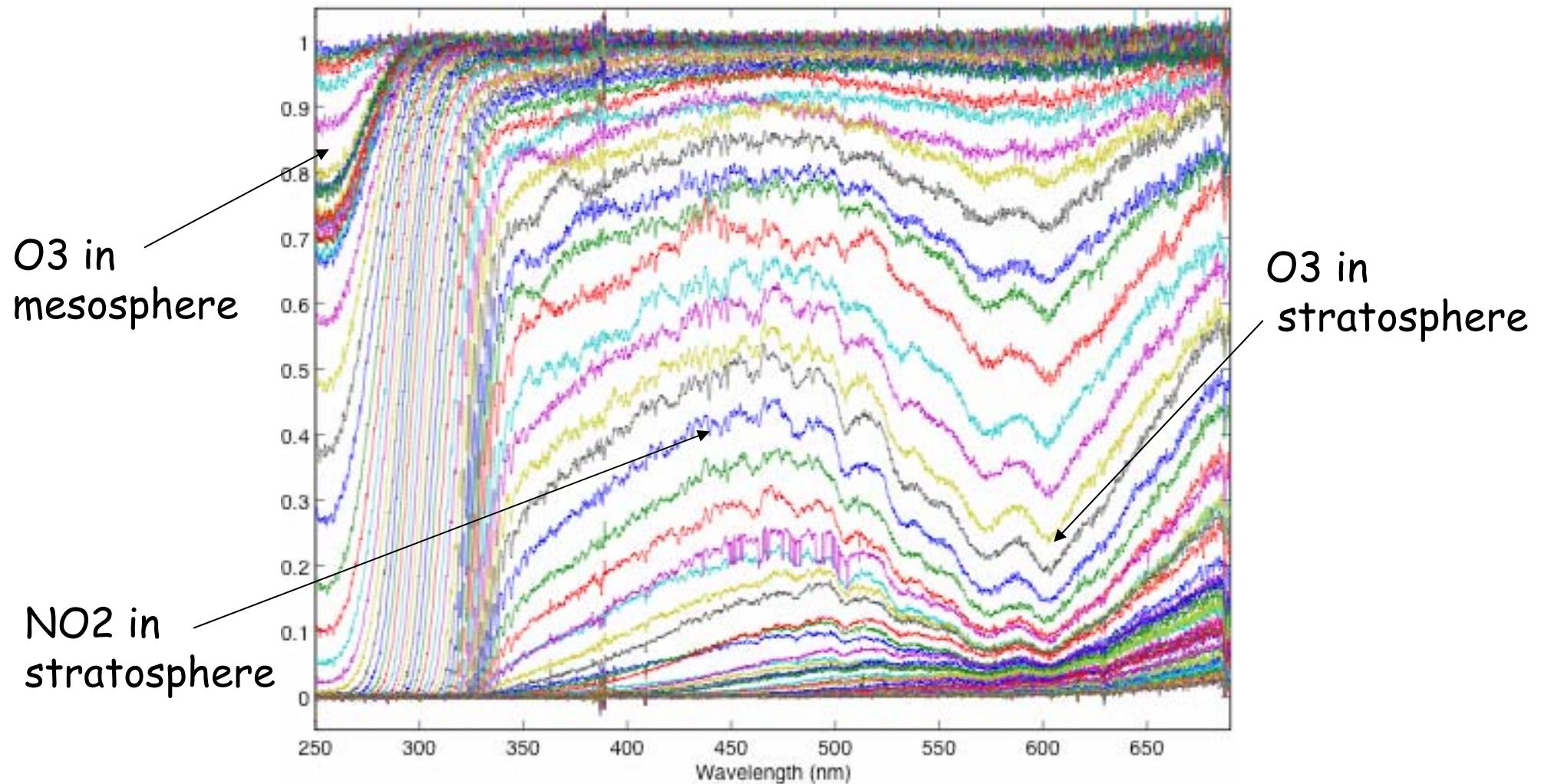
Day (45%)  
solar zenith: 0-90 deg

Twilight (10%)

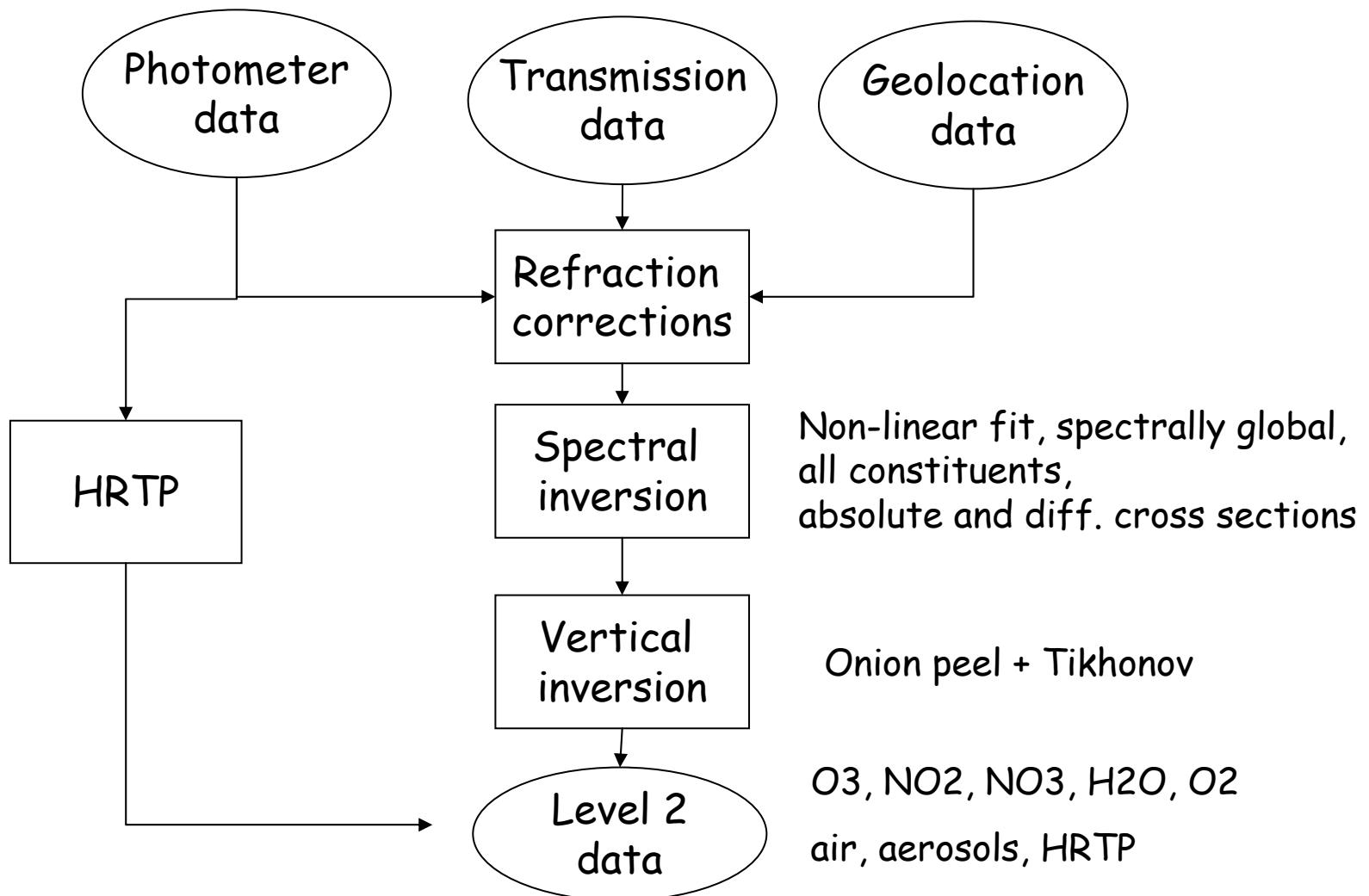
# GOMOS data processing Level 1



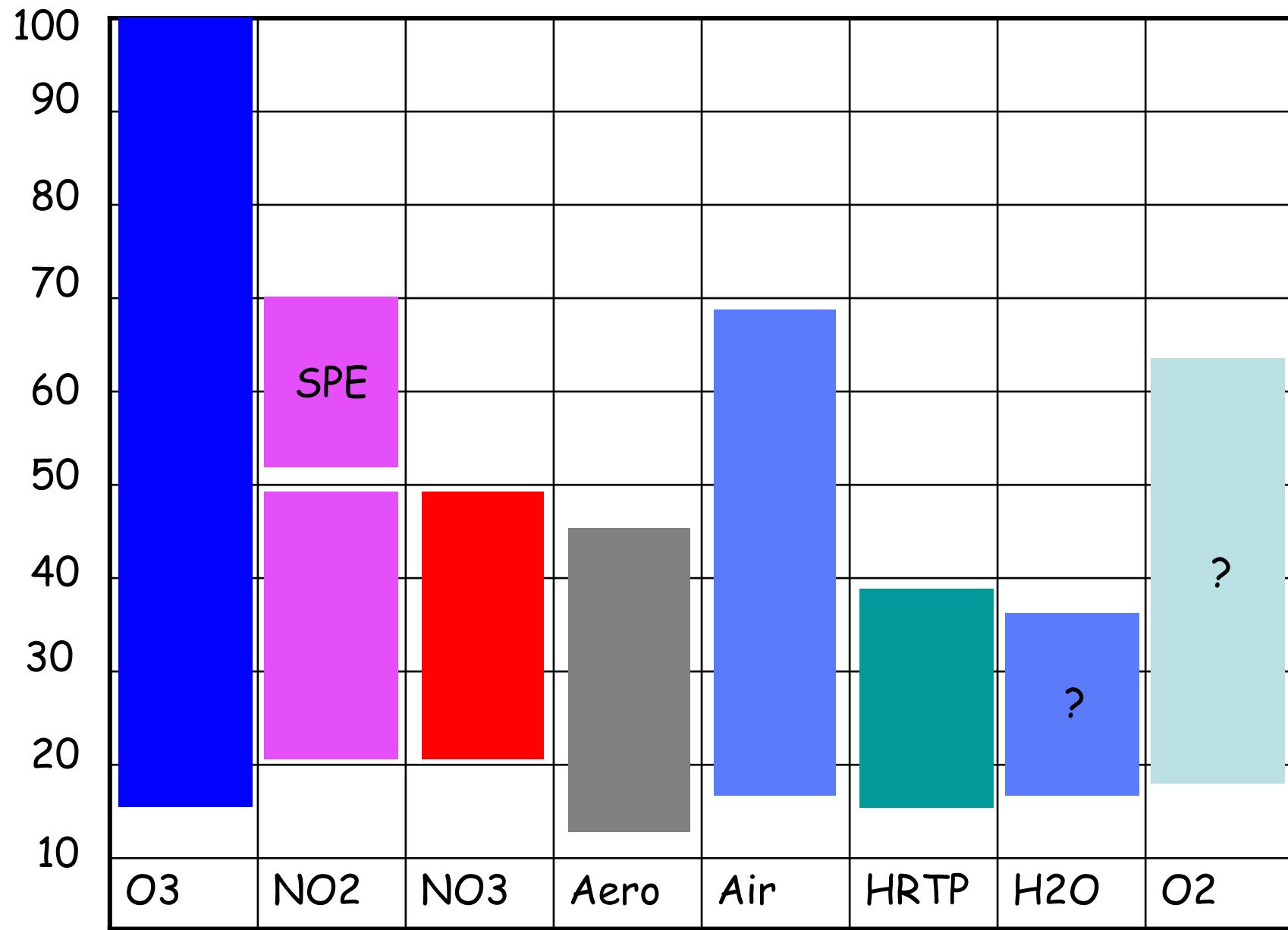
# GOMOS: Horizontal transmissions 100-5 km



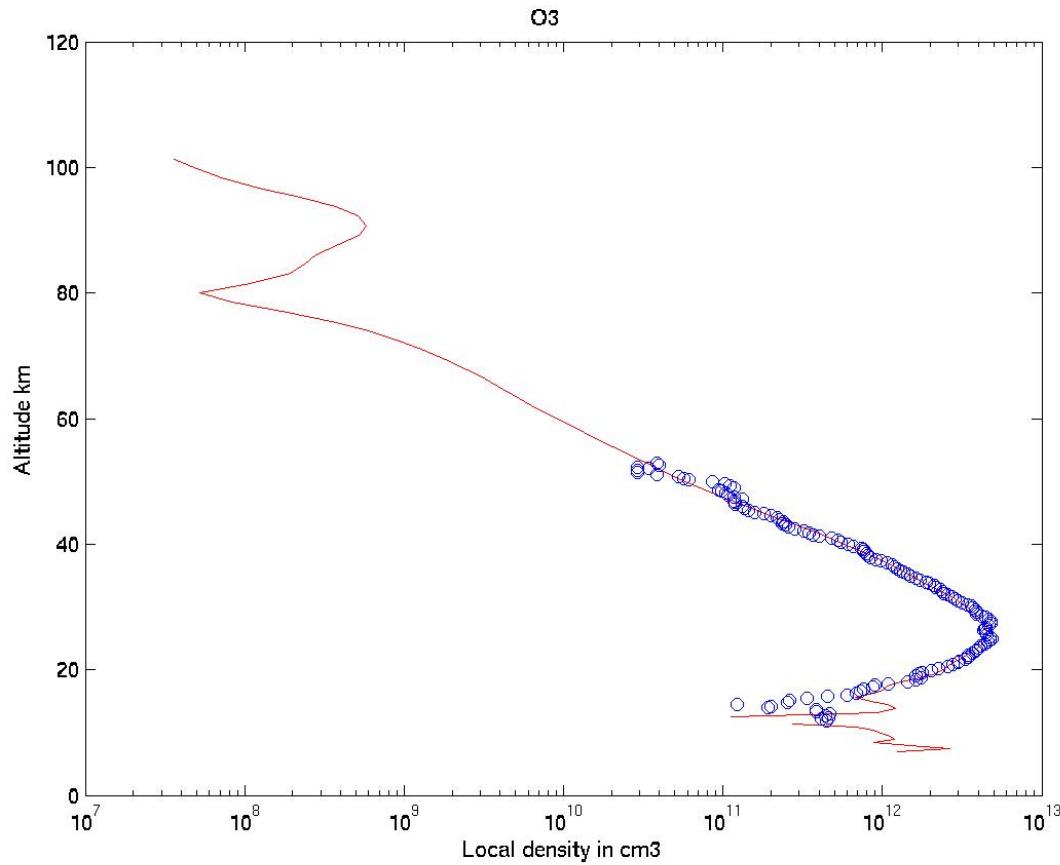
# GOMOS Level 2 retrieval



# Retrieved species with altitude ranges

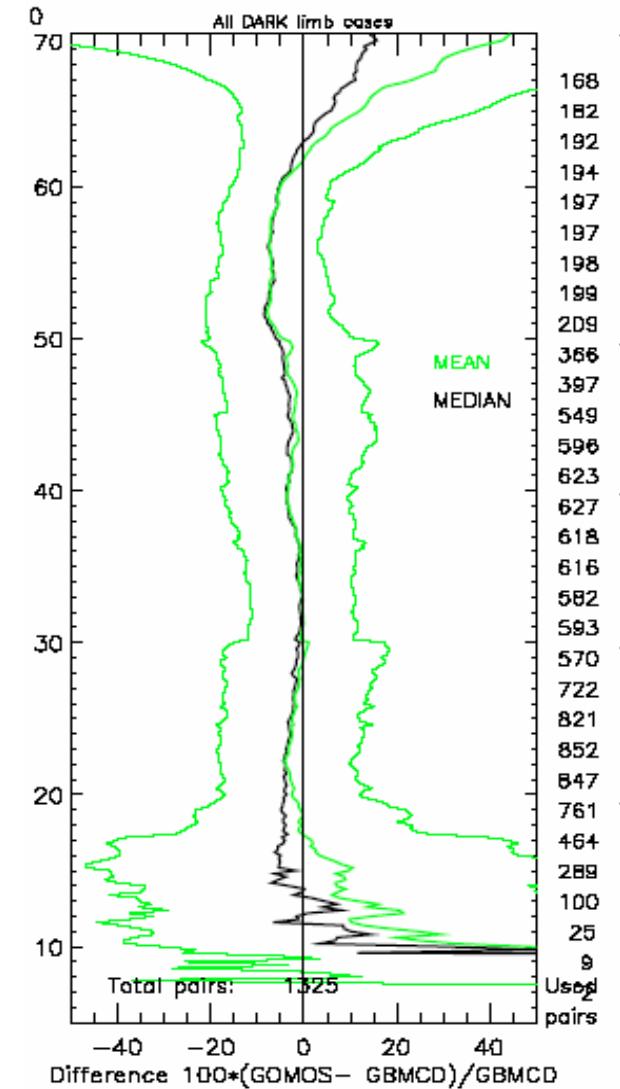


# Validation with ground based instruments

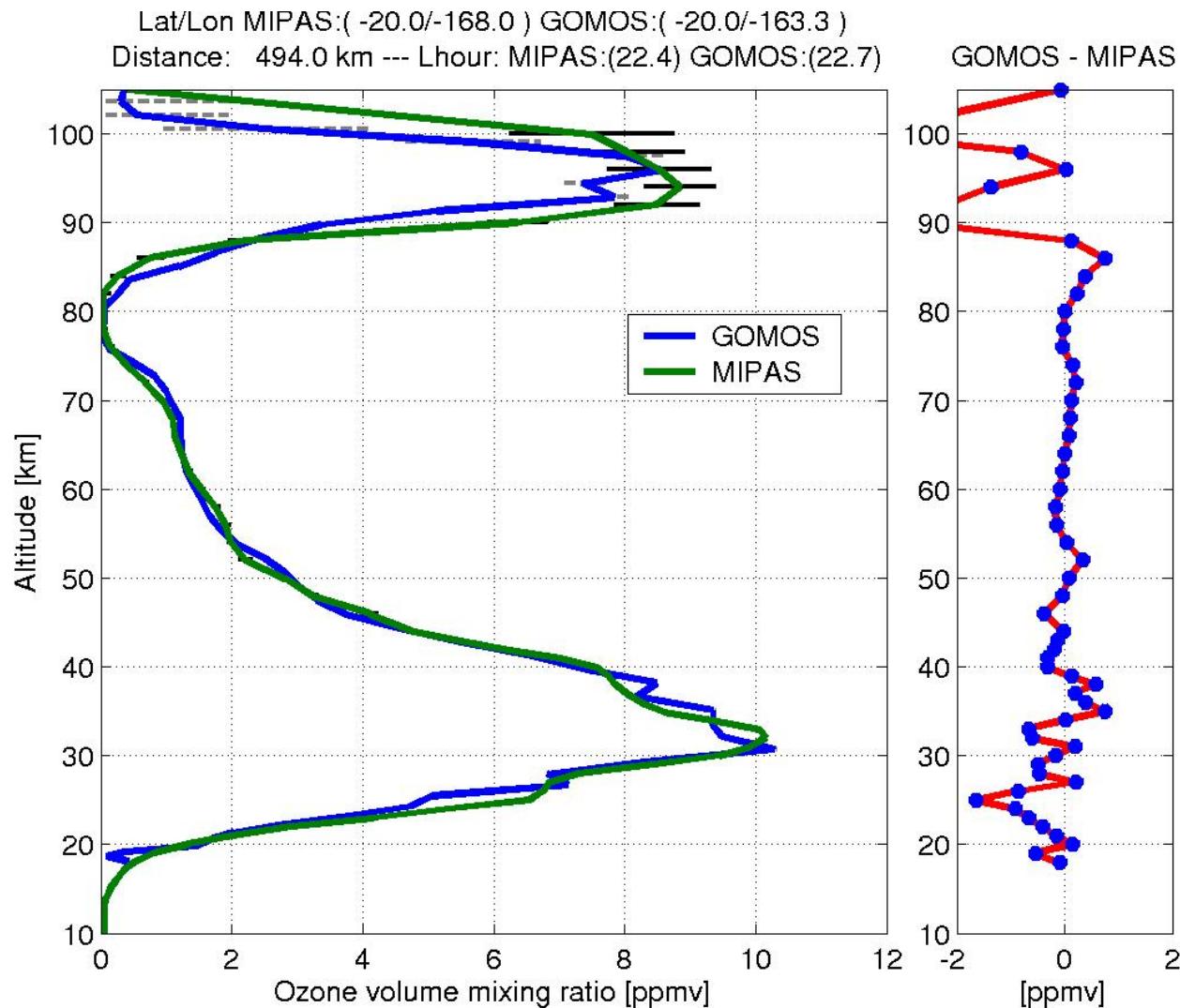


GOMOS vs Mauna Loa ozone lidar

Statistics of GOMOS vs. ground based instruments  
(from Y. Meijer et al., JGR, 2004)

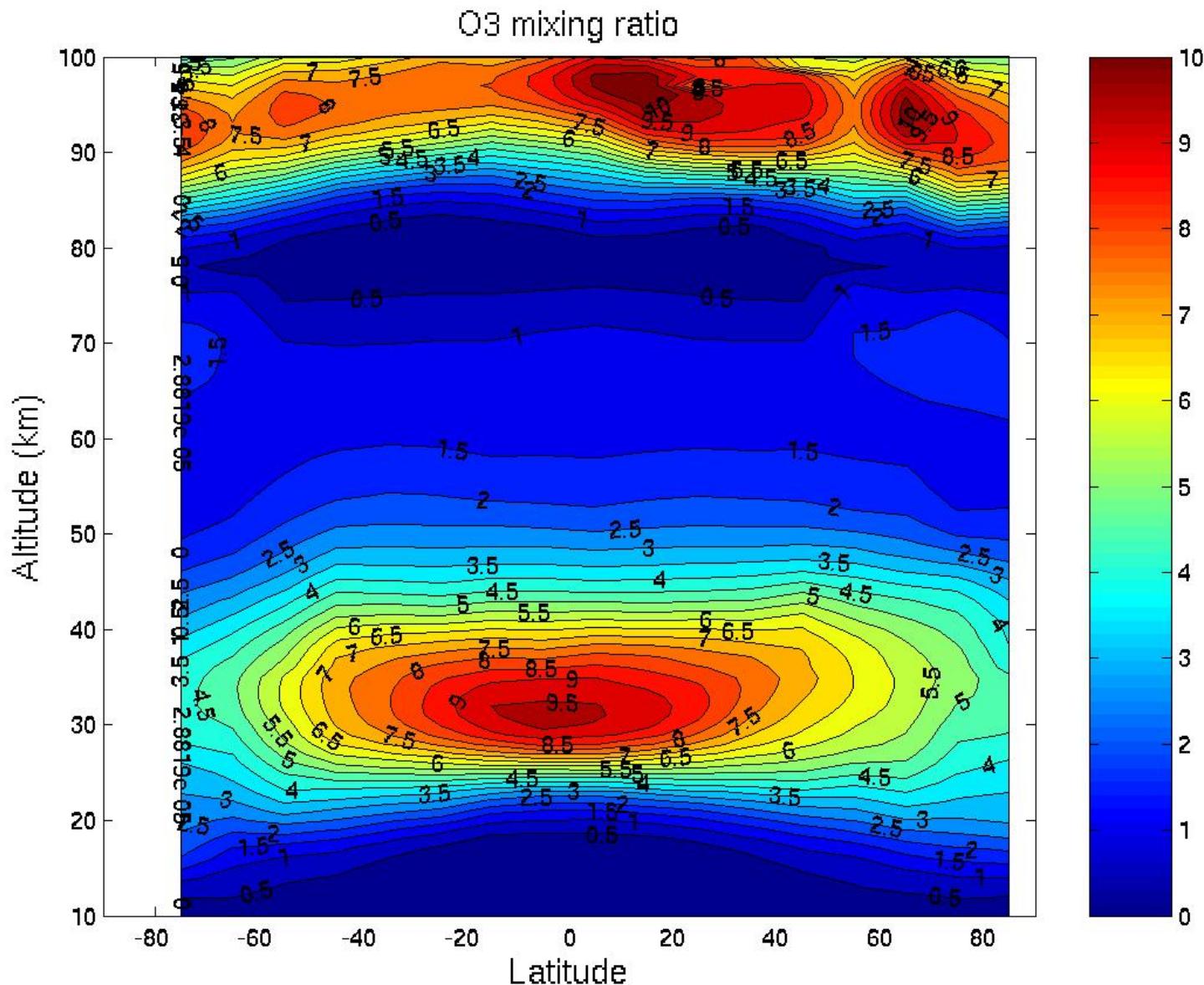


# GOMOS-MIPAS comparison

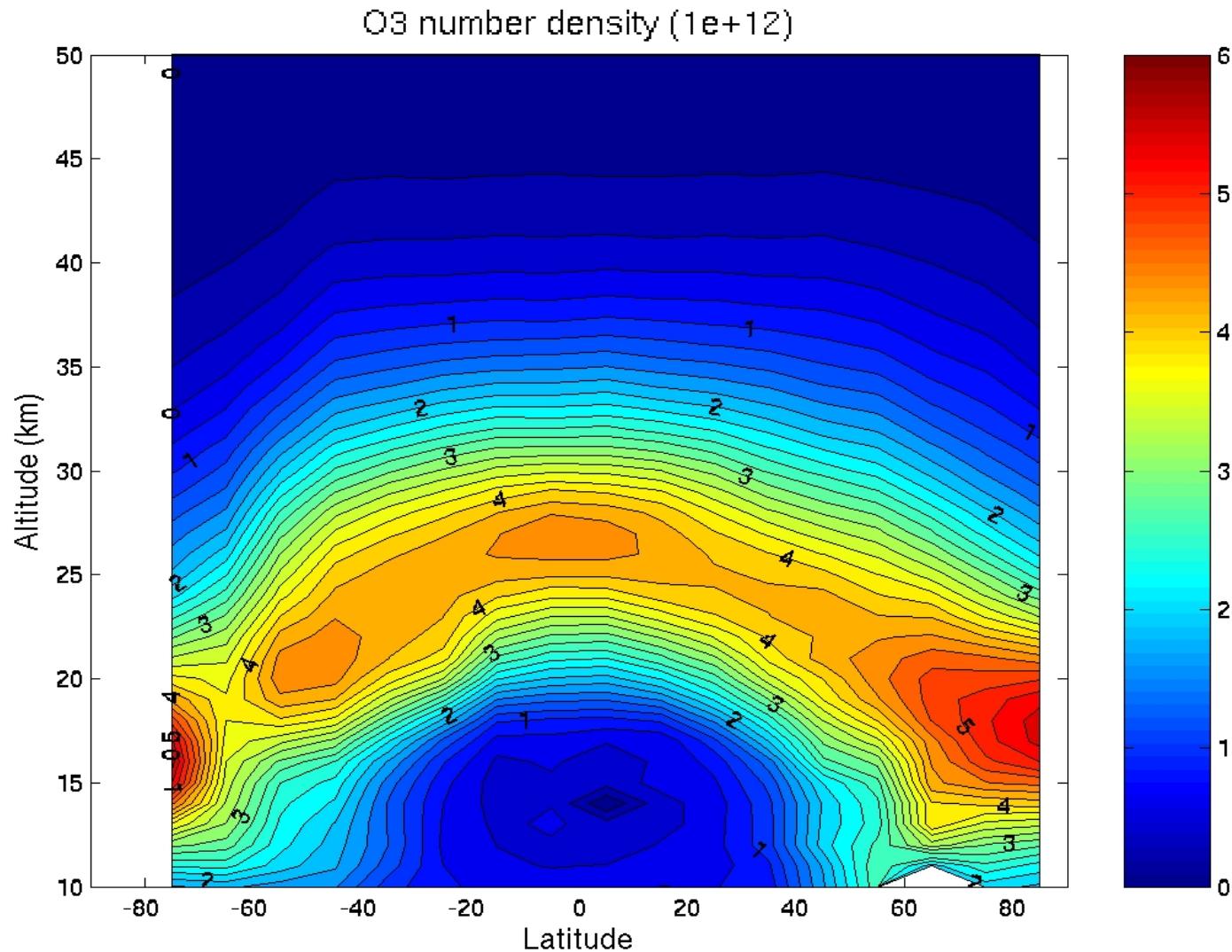


From Verronen et al., to be published in Adv. Space Res., 2005

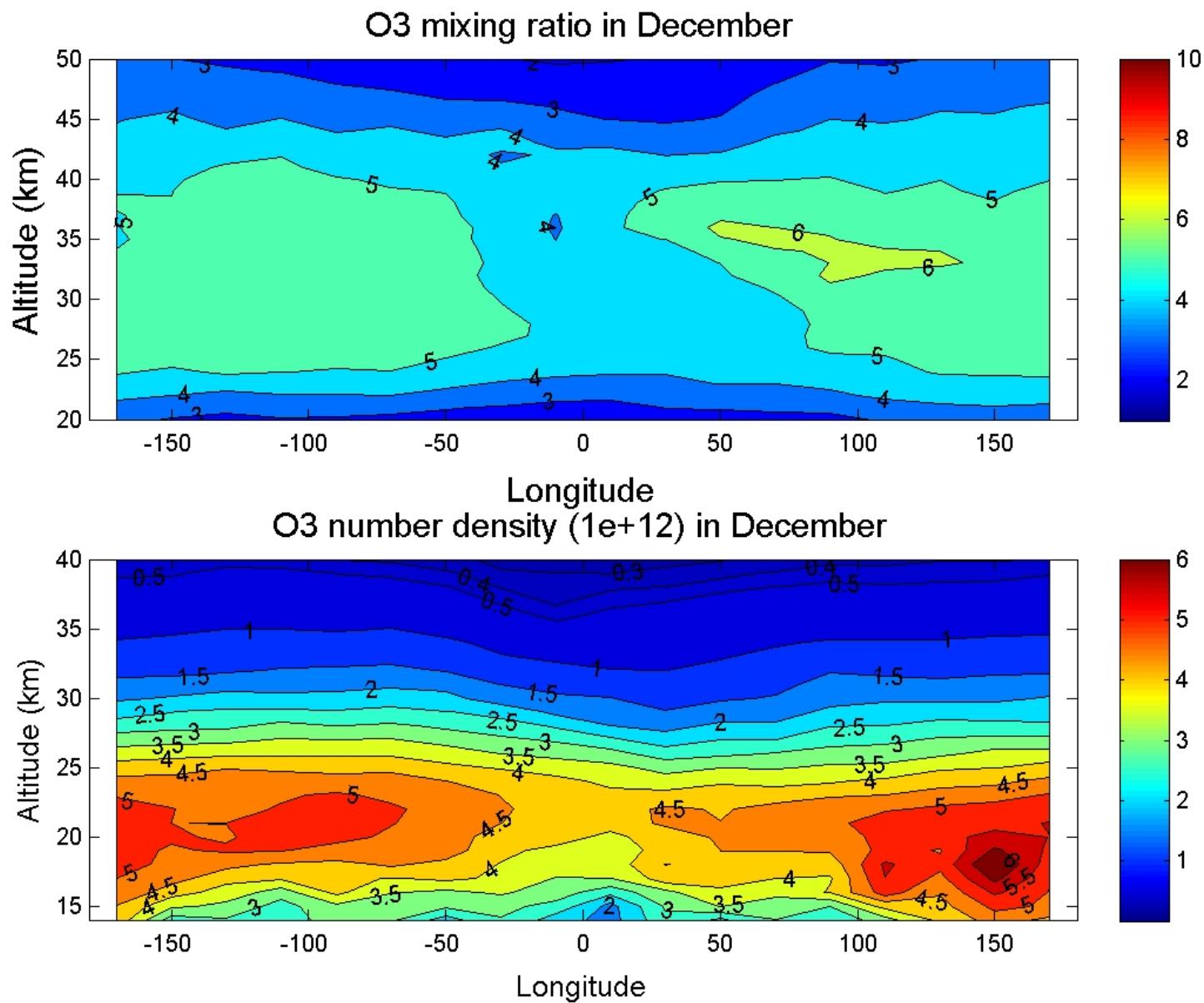
# Zonal & yearly median O3 mix ratio



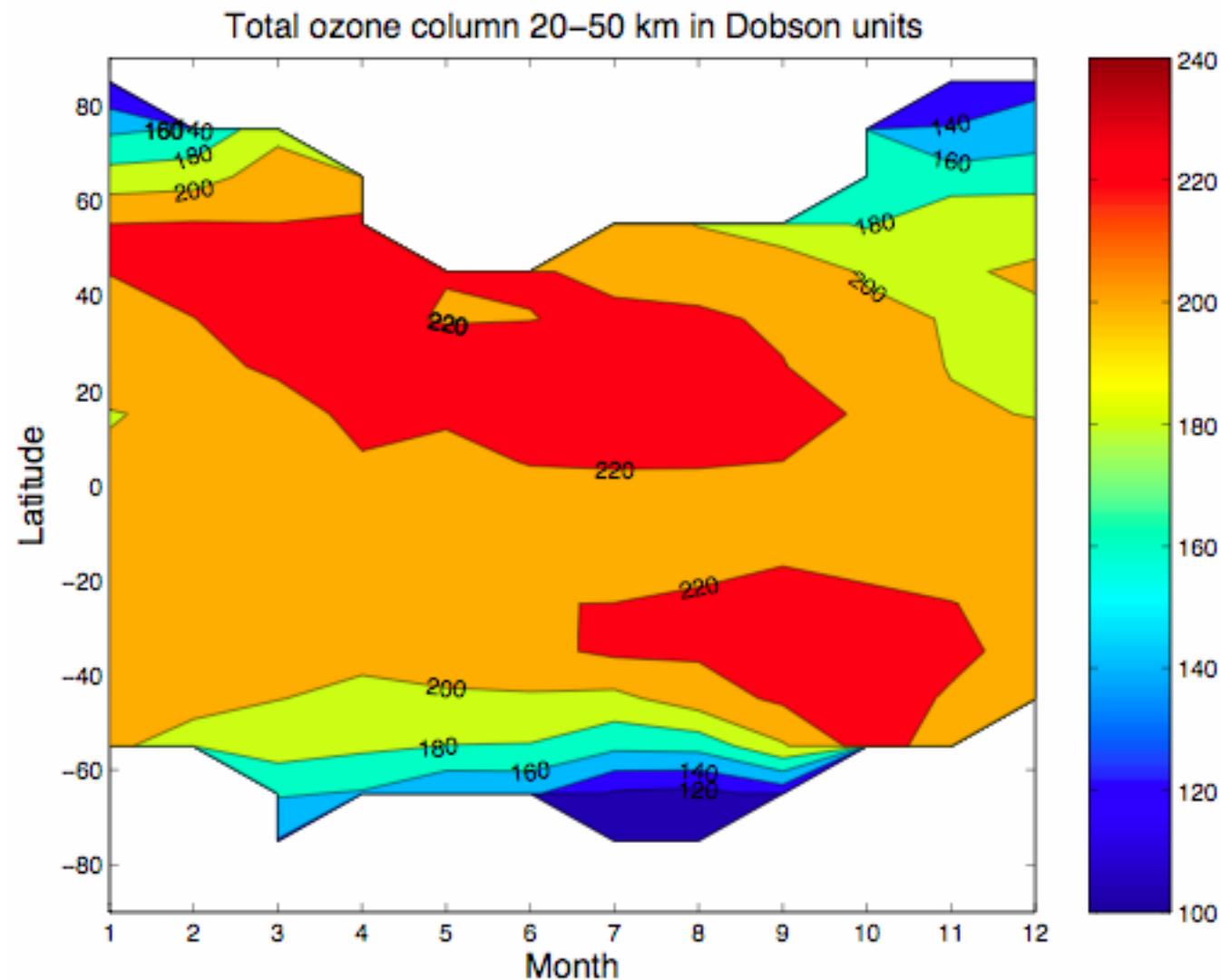
# Zonal & yearly median O<sub>3</sub> number density



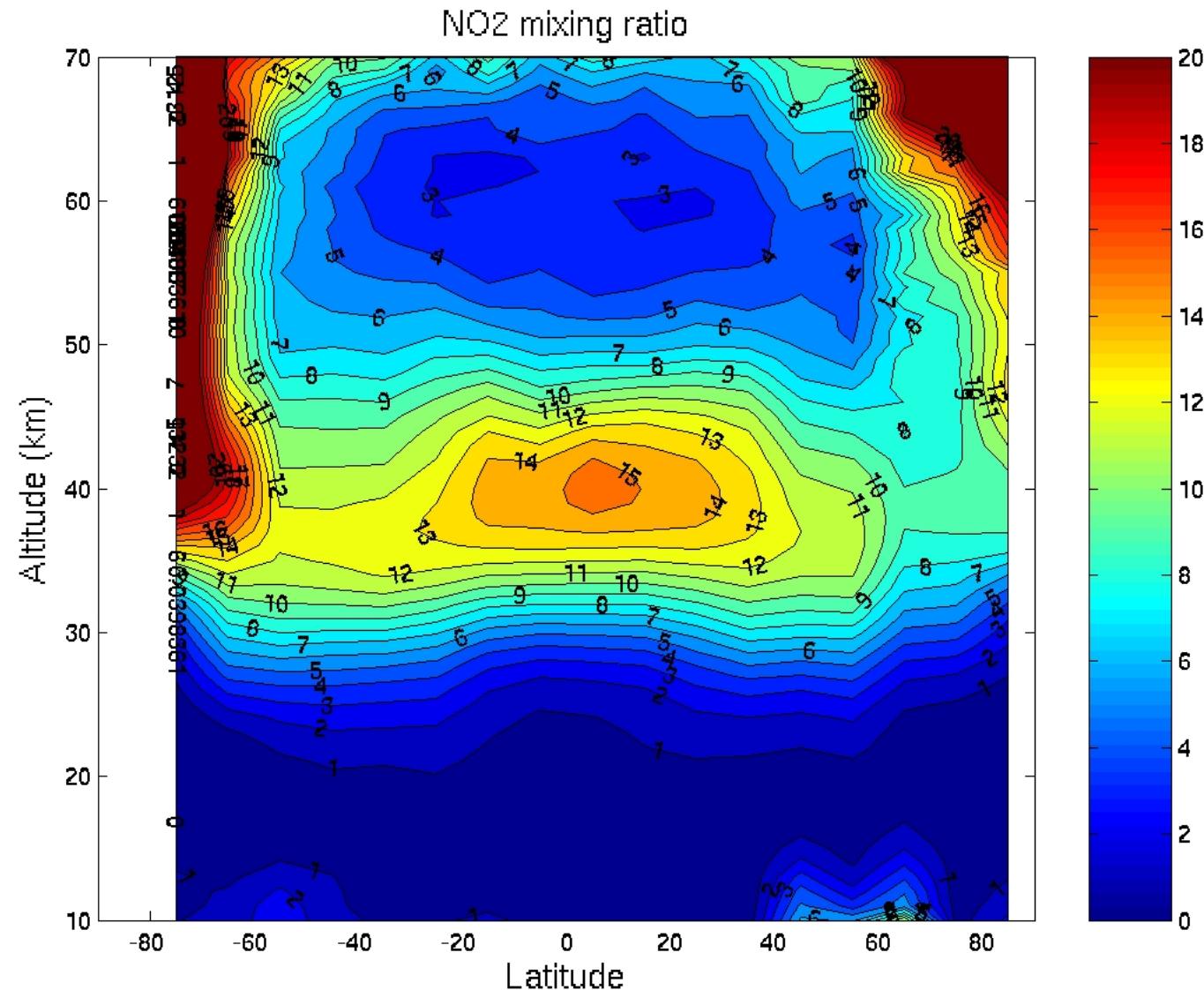
# Monthly median O<sub>3</sub> in 50-60 N



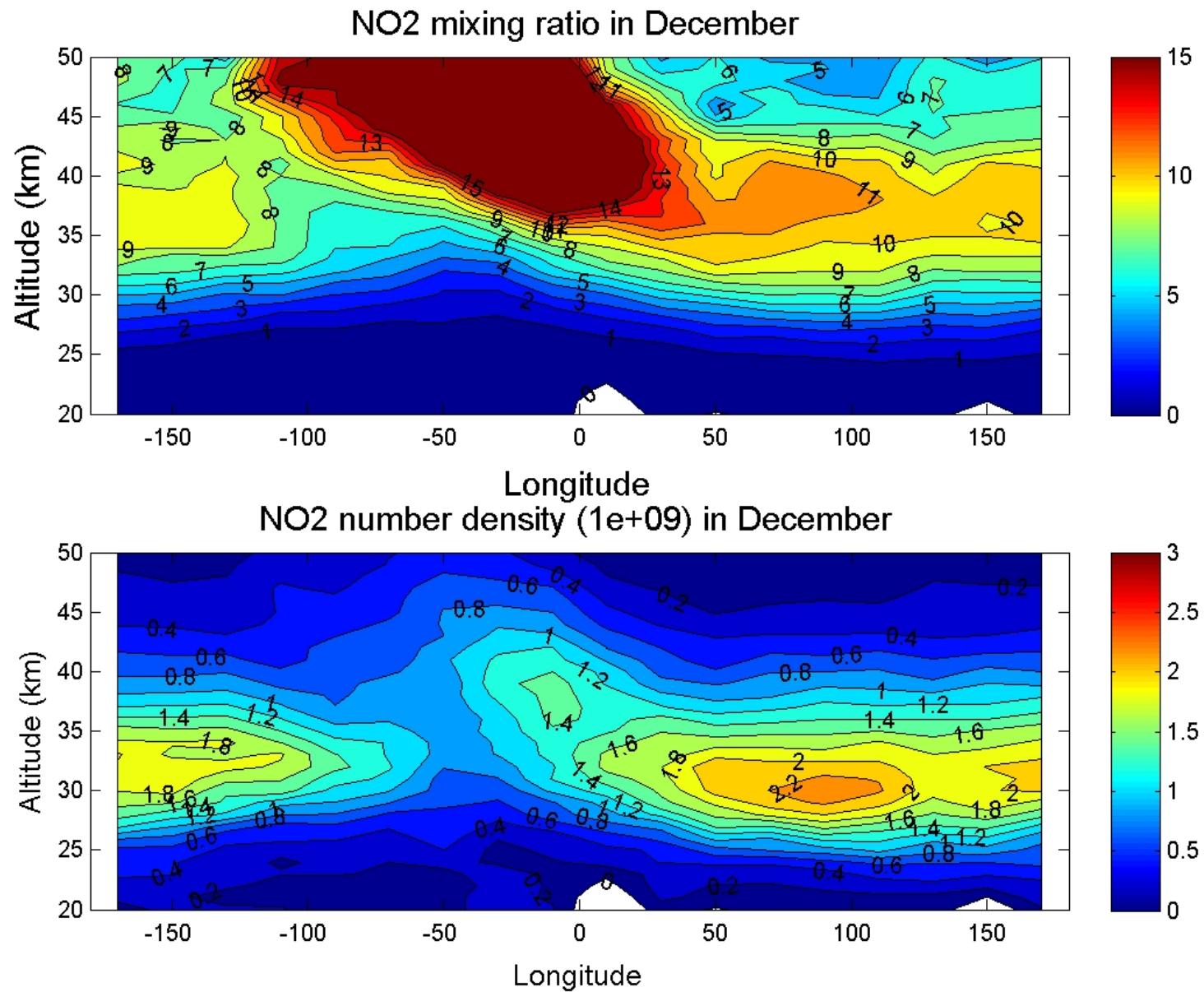
# Zonal median O3 column 20-50 km



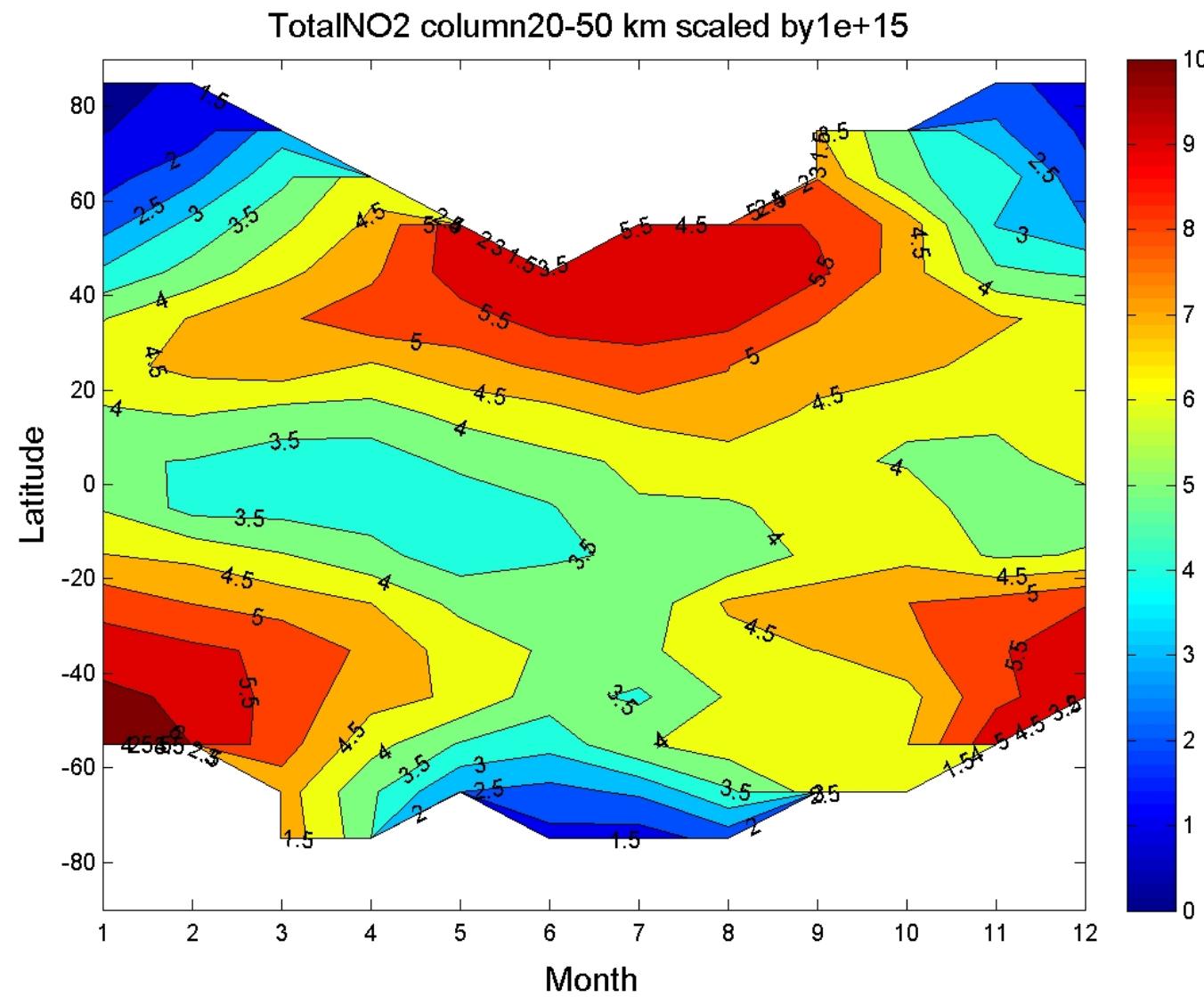
# Zonal & yearly median NO<sub>2</sub> mix ratio



# Monthly median NO<sub>2</sub> in 50-60 N



# Zonal median NO<sub>2</sub> column 20-50 km



# GOMOS highlights

- Ozone climatology -> Kyrölä et al. (in preparation)
- Proton events in 2003 -> Seppälä et al., GRL, 2004
- NO<sub>2</sub> & NO<sub>3</sub> climatology -> Hauchecorne et al., JGR, 2005,  
poster **in this mtg.**
- Aerosol climatology -> Vanhelmont et al., ACP, 2005
- Turbulence studies -> Gurvich et al., JGR, 2005
- Sodium layer -> Fussen et al., GRL, 2005
- OCIO -> Fussen et al., poster **in this mtg.**